

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)	
)	
An Inquiry Into the Commission's)	
Policies and Rules Regarding AM)	MM Docket No. 93-177
Radio Service Directional Antenna)	RM-7594
Performance Verification)	

COMMENTS OF SELLMAYER ENGINEERING
ON FURTHER NOTICE OF PROPOSED RULEMAKING

DA 07-2143

FCC Public Notice Dated May 23, 2007

Comment Date: July 23, 2007

Sellmeyer Engineering is an Engineering Firm engaged in the practice of consulting engineering before the Federal Communications Commission. The Firm participated in "The AM Directional Antenna Performance Verification Coalition" conferences. The following comments are offered in the above captioned matter.

73.151, Directional Antenna Performance Verification

We support the proposed changes to Section 73.151 of the Rules. We suggest the following clarifications:

73.151(a)(2i):

For towers using base current or base voltage sampling derived at the output of the antenna coupling and matching equipment, the sampling devices shall be disconnected and calibrated by measuring their outputs with a common reference signal, **at the carrier frequency**, (a current through them or a

voltage across them, as appropriate) and the calibration must agree within the manufacturer's specifications.

73.151(a)(3):

Reference field strength measurement locations shall be established in directions where the standard pattern unattenuated field strength is within 3 dB of the value for each pattern minimum and the absolute pattern maximum.

The field strength shall be measured at each reference location, three to eight points along each reference radial within ten kilometers from the array at the time of the proof of performance and its value, along with a complete description of the location, shall be placed in the station's public inspection file and shall be filed as an exhibit with FCC Form 302-AM.

Please refer to the paragraph titled "Field Reference Points" for further discussion of the reference points.

73.151(b)(iii)(B):

(B) An accurate and detailed description of each monitoring point. The description shall include, but shall not be limited to, geographic coordinates determined with a Global Positioning System receiver with the reference datum used by receiver reported.

73.61 AM directional antenna field strength measurements

We support the proposed changes in this Rule.

73.155: Periodic Directional Antenna Recertification

We support the proposed Section 73.155 of the Rules. We suggest the following clarifications:

(a) Measurements shall be made to verify the continuing integrity of the antenna monitor sampling system.

(1) For towers using base current or base voltage sampling derived at the output of the antenna coupling and matching equipment, the sampling devices shall be disconnected and calibrated by measuring their outputs with a common **carrier frequency** reference signal (a current through them or a voltage across them, as appropriate) and the calibration must agree with the manufacturer's specifications.

(c) The results of the periodic directional antenna performance recertification measurements shall be retained in the station's public inspection file **and shall be filed as an exhibit with Form 302-AM reporting any changes to the system.**

DISCUSSION OF PROPOSED RULE CHANGES:

We believe that verification of proper calibration of the sampling elements (current or voltage sampling element) should be conducted on or near the carrier frequency to identify any

anomalies resulting from stray inductance of capacitance in the instrumentation.

The need for field strength reference data derives from the need for diagnostic tools external to the array through which third parties such as FCC Staff, station engineers and other interested parties may be able to determine, in the future, if the array is performing as originally constructed. I must be kept in mind that the normal field measurements used in the Proof of Performance will not be available for reference. No other method independent of the monitoring system at the transmitter site will be available for use as a diagnostic tool. It is our belief that a group of three to eight measurements, properly documented and made at carefully chosen locations along or near each minima of the array and one set in or near the maximum radiation of the main lobe will not impose an unreasonable requirement on the permittee and will provide good diagnostic tools for future evaluation of array operation.

We believe that any GPS position data should be backed up with the GPS Receiver Datum reference used to generate that information. In many years of practice we have observed that few station or maintenance personnel are aware of the Datum Reference Settings of GPS receivers. All data should be reported with respect to True North in the Degrees, Minutes, Seconds format in

Kilometers with the Datum Reference Setting reported. NAD-27, NAD-83 or WGS-84 are all acceptable and are easily converted if the original reference is known.

We believe that the Periodic Sample System Recertification should occur each two years and that a formal filing should be required on Form 302-AM upon completion. We have observed many instances where periodic measurements which are required to be made and placed in the "Public File" are not made. Examples are the annual occupied bandwidth measurements for AM stations. It is our observation that these are seldom made on a regular basis. Formal filing of FCC Form 302-AM with any changes noted would go a long way to assure the work is actually done on a timely basis. The absence of such data could easily be flagged for enforcement purposes by monitoring CDBS entres.

We believe the data noted in the previous paragraphs should be filed as an exhibit attached to Form 302-AM so that it will be available in the future to anyone requiring it.

SAMPLE SYSTEM DOCUMENTATION AND REPORTING

The following comments are offered to explain the detail required to allow restoration or reconstruction of a sample system used for directional antenna performance verification to prove proper adjustment of a directional antenna placed into service under the method of moments modeling method. It must be

kept in mind that the sample system is the **only** method of
verifying proper adjustment of an array since no field
measurements are recorded to substantiate the performance. As
such, details of the sample system construction must be readily
available to the Commission Staff and engineers and technicians
responsible for maintenance of the directive array. For this
reason, we believe that the data relevant to construction of the
system should be filed as part of FCC Form 302-AM.

It is well established by the number of fines related to
items missing from "Public Files" that information frequently
disappears from such files. Formal filing of a form which is part
of Form 302-AM will assure future availability of information
critical to verification of directional antenna performance in
the manner of the present practice related to Directional Antenna
Proof(s) of Performance. The addition to Form 302-AM merely
formalizes reporting of measured data normally acquired during
the adjustment process of a directive array and is much less
burdensome to the licensee and the Commission Staff than the
volume of data required to document a full proof of performance
as presently required.

To that end, it is suggested that a section be added to FCC
Form 302-AM which thoroughly and accurately documents the
original sampling system in sufficient detail that any part of

the system may be replaced as needed in the future and the original adjustment be restored by reference to the antenna monitor parameters. Sufficient measurements of the system elements shall be made and properly documented at the time of the original adjustment. This will assure that the system as constructed can be restored to the original condition at any time in the future should a sampling element, an isolation coil, if one is used, or a section of transmission line is damaged or destroyed.

SAMPLE SYSTEM CONSTRUCTION DETAILS

It is well understood that the Commission Staff does not normally become involved in construction details of Broadcast facilities. We do not advocate such involvement. We suggest, however, that certain details of the sample system be reported on Form 302-AM for information purposes only to preserve the original construction details of the sample system to facilitate future repair and maintenance of the system. The supplied details should be in the form of an exhibit attached to the Form 302-AM filing and need not be appended to the resulting license if the Commission does not deem it necessary. The exhibit should be retained in the station files of the Commission for future reference.

Such details as the connector type on a sample line, length

and type of a tower mounted sample line or loop on a tower are critical to proper maintenance of the system. Having this information readily available on an FCC form, either on line or retrievable from the Commission's files, is invaluable when the files maintained at the radio station get lost as they frequently do in this "modern age" of broadcasting. The effort to compile and file the data as part of Form 302-AM is much less burdensome than preparation of the full proof of performance currently required.

It is suggested that flexible jumpers be accommodated at the monitor and at the sampling transformers if they are used. The use of solid outer conductor cables, particularly one half inch cables, places unnecessary stress on the monitor connectors which can be exacerbated by a technician poking around in a rack. This cable should be flexible and of the double shielded variety such as RG-142/U, RG-223/U or similar cables. These cables will satisfy the original intent of solid outer conductor cable without the problems related to cable rigidity resulting from such cables. A reasonable limit should be placed on the length of the cables. A length of ten feet is suggested for monitor cables and three feet for sample transformer cables.

MEASUREMENTS REQUIRED

It is recognized that certain electrical measurements of

sample lines and devices will be required to establish cable electrical lengths and impedance. The open circuit and all measurements made with the system terminated in the sample devices shall be made with all connectors in place with the distant end of the cable disconnected or terminated in the sample device as appropriate. This will assure consistent results which are easily repeatable at any time.

These measurements shall be reported on FCC Form 302-AM under the paragraph titled "SAMPLE SYSTEM DATA".

PLACEMENT OF SAMPLE LOOPS ON TOWERS

The sample loop shall be located at the location on the tower where the field in the tower would be at minimum when the tower is properly detuned. The height above ground level of the bottom of the loop and bearing of the plane of the loop, referenced to true north, along with the physical height and width of the loop and the distance of the grounded side of the loop from the tower shall be reported in the Sample System paragraph of FCC Form 302-AM. The bottom of the loop shall be electrically bonded to the tower through a metal or plating compatible with a galvanized surface.

A suggested addition to Form 302-AM is attached for consideration.

FIELD REFERENCE POINTS

We strongly recommend that a set of field reference points along radials located on bearings in which the field is within three (3) dB of each of the minima should be established for future reference to be used as indicators of the likely status of an array. There should be a number of points along each of the radials and the major lobe which should be measured and recorded following final adjustment of each array. The exact number of points is not important, but there should be a sufficient number distributed over a ten kilometer or so radial to assure that one or more will remain useful into the future for reference purposes. It is suggested that three to eight points be documented as to distance and bearing from the array reference point with corrected GPS coordinates and the GPS Datum reference for such coordinates along each minima radial and at least one of the main lobes. The points should be taken at locations not apt to be destroyed by future construction. The data should be presented in tabular form as an exhibit attached to Form 302-AM.

No field analysis should be required and the points should not constitute "licensed" radiation levels or have any routine measurement requirement. Such data will provide a first order indication of the array operation which would be useful for judging whether further analysis of an array is necessary in the

instance of an interference situation, apparent poor efficiency of an array or for due diligence inspections prior to a sale of the facility. Filing the data as part of the license application will preserve it in written form for the future date when significant repairs may be required.

CONSTRUCTION NEAR AM DIRECTIONAL ARRAYS, PART 17


The Coalition also proposed a new rule under Part 17 that would harmonize the disparate treatment afforded under Section 22.371, Section 27.63, and Section 73.1692 with respect to disturbances caused to AM stations as a consequence of construction near or installation on an AM broadcast antenna system or tower. We believe that this proposal will reduce confusion among affected FCC licensees with respect to the proper procedures for the protection of AM broadcast stations whose antenna patterns can be adversely affected by the proximity of new towers or antenna. In addition, the proposed procedures will substantially reduce the time required to determine the impact on the affected AM station and the expense associated with that analysis.

CONCLUSIONS

For the reasons set forth herein, Sellmeyer Engineering respectfully requests that the Commission authorize the use of moment method computer modeling to verify the performance of AM

directional antennas and to evaluate the potential effects of nearby re-radiators on AM patterns. We support adoption, with the exceptions noted, the proposed new and modified rules proposed by the Coalition.

Respectfully submitted,


J. S. Sellmeyer, P.E.

(-) SAMPLE SYSTEM DESCRIPTION

FACILITY ID: _____ CALL: _____ FREQ: _____ LOCATION: _____

(A) SAMPLE TYPE:

☐ CURRENT TRANSFORMER MFR: _____ TYPE: _____ SENSITIVITY: _____ V/A
☐ VOLTAGE SAMPLE MFR: _____ TYPE: _____ SENSITIVITY: _____ V/V
☐ SIDE MOUNTED LOOP MFR: _____ TYPE: _____ LENGTH: _____ INCHES WIDTH: _____ INCHES TWR OFFSET, INCHES: _____
ELEVATION, MTRS AGL: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____
BEARING (DEG TRUE): TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

(B) TRANSMISSION LINES:

MONITOR JUMPER CABLE (IF USED):
MFR: _____ TYPE: _____ LENGTH: _____ INCHES MON CONN; MFR: _____ TYPE: _____ LINE CONN; MFR: _____ TYPE: _____

SAMPLE LINE, ACU TO MONITOR LOCATION:
MFR: _____ TYPE: _____ LENGTH: _____ METERS

MON CONN; MFR: _____ TYPE: _____ ACU CONN; MFR: _____ TYPE: _____

1/4 WAVE RES FREQ, kHz: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

ACU JUMPER CABLE (IF USED):
MFR: _____ TYPE: _____ LENGTH: _____ INCHES

MON CONN; MFR: _____ TYPE: _____ LINE CONN; MFR: _____ TYPE: _____

SAMPLE LINE, TOWER RUN:
MFR: _____ TYPE: _____ LENGTH: _____ METERS

ACU CONN; MFR: _____ TYPE: _____ LOOP CONN; MFR: _____ TYPE: _____

1/4 WAVE RES FREQ, kHz: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

(C) ISOLATION INDUCTOR (IF USED):

MFR: _____ TYPE: _____ INDUCTANCE: _____ uHy TURNS: TOTAL: _____ TAPPED AT: _____ ☐ OPEN ☐ SHORTED

DIA: _____ INCHES LENGTH: _____ INCHES RESONATING CAPACITOR, (IF USED): VALUE: _____ pFd TYPE: _____ VOLTAGE: _____ kV

LINE MFR: _____ TYPE: _____ LENGTH: _____ INCHES

LINE CONN-1; MFR: _____ TYPE: _____ LINE CONN-2; MFR: _____ TYPE: _____

1/4 WAVE RES FREQ, kHz: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

(D) SYSTEM MEASUREMENTS, MONITOR CONNECTOR TO SAMPLE DEVICE

1/4 WAVE RES FREQ, kHz: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

ELECT LENGTH, DEGREES: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

DIFFERENTIAL DEGREES: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

MEASURED SYSTEM O/C RESISTANCE
AT - 1/8 LAMDA, OHMS: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

MEASURED SYSTEM O/C REACTANCE
AT -1/8 LAMDA, OHMS: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

MEASURED SYSTEM O/C RESISTANCE
AT + 1/8 LAMDA, OHMS: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

MEASURED SYSTEM O/C REACTANCE
AT +1/8 LAMDA, OHMS: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

MEASURED SYSTEM
IMPEDANCE, OHMS: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

MEASURED SYSTEM RESISTANCE
AT CXR FREQ, OHMS: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

MEASURED SYSTEM REACTANCE
AT CXR FREQ, OHMS: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

(E) OBSERVED ANTENNA MONITOR PARAMETERS

RATIO: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

PHASE: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

SAMPLE DEVICE SERIAL NO: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

(F) MONITOR SYSTEM CALIBRATION, NON-DIRECTIONAL:

RATIO: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

PHASE: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

NON-DIRECTIONAL TWR: TWR-1: _____ TWR-2: _____ TWR-3: _____ TWR-4: _____ TWR-5: _____ TWR-6: _____

(G) ANTENNA MONITOR INFORMATION

MANUFACTURER: _____ TYPE: _____ SERIAL NO: _____ CAL DATE: _____